COMPENSATION FOR POLARIZATION MODE DISPERSION IN SINGLE MODE FIBER

ABSTRACT OF THE DISCLOSURE

A receiver employs non-linear threshold compensation to adjust input sample values from a single mode fiber to mitigate effects of polarization mode dispersion. A difference S between values for i) a decision for the current input sample and ii) a decision for the previous input sample is generated that indicates whether a transition between logic values occurred in the input data and the direction of transition (sign/phase). Two values are generated to determine a magnitude c of correction combined with the sign/phase (difference S) to generate a correction value. An error value e is generated as the magnitude of the difference between i) the decision for the input sample and ii) the input sample. A value d is calculated as the magnitude of the difference between i) the current input sample and ii) the previous input sample is also generated. The value d represents a relative "closeness" in value between two consecutive input samples. A magnitude c of correction combined with S is dependent upon the current states of S, e, and d and is based on detection of the presence or absence of a data transition, closeness in value between two consecutive input samples, and the error between the current sample and the decision for the current sample. The correction value is then combined with the current sample y_k to generate a compensated sample. A hard decision is then generated for the compensated sample. Observation of transmitted data patterns for bit combinations through a single mode fiber at the transmission rate, e.g., 10 Gbps, allows for generation of a table of rules to determine the threshold levels L of each decision device. As decisions are generated for data, threshold value L may then be modified given the decisions for previous samples.